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ABSTRACT

Six studies relevant to the analysis of generalized imitative behavior are described. The first examined the role of verbal instructions in generalized imitation by comparing the use of a "do this" instruction with no such instruction and the use of positive reinforcement with no reinforcement. The tenacity of generalized imitation in this study led to the second experiment, designed to determine whether generalized imitation would occur in the total absence of verbal instructions. The evidence in the first two studies of the ineffectiveness of observation of a differentially performing model in producing discriminative imitation led to two further studies. Observation of a differentially responding confederate proved ineffective in both studies, but the observational procedure was not used until the Ss had a history of responding nondifferentially. Consequently, another experiment was conducted to determine whether this history might be responsible for the results; in this experiment, observation of differentially performing adult was made from the beginning of the study. Differential responses in imitation of the adult were noted throughout this experiment. Another experiment was conducted to study the effects of observation of the same or different behavior and the use or lack of reinforcement. The data together suggest that generalized imitation is largely a function of the priming procedures used to generate the imitative behavior. (KM)

IMPLICIT INSTRUCTIONS AND SOCIAL INFLUENCE IN "GENERALIZED IMITATION" AND OTHER "GO - NO-GO" SITUATIONS[1]

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Differential reinforcement is often used as a central explanatory principle to account for the development and maintenance of discriminative behavior. Presumably, responses that result in reinforcing consequences are developed and maintained, while responses that result in neutral consequences remain unaffected or are decreased.

Although it is exceedingly well documented, both in basic research and in applied research, that differential reinforcement procedures are, indeed, effective in creating and maintaining differential behavior, there also are several notable exceptions in the literature in which the systematic and precise use of differential reinforcement has failed repeatedly to produce the differential behavior expected. One such set of exceptions has been the research on "generalized imitation."

"Generalized imitation" refers to the continued imitation of unreinforced responses when other responses are maintained by reinforcement. In other words, generalized imitation is characterized by persistent nondifferential behavior, even though consistent and repeated differential reinforcement is judiciously applied.

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Since its initial demonstration by Baer and Sherman in 1964, many studies have replicated the generalized imitation effect, using a variety of response classes, situations, and procedural variations, and investigating children of various ages, clinical classifications, and other demographic characteristics.

Recently, numerous studies have attempted to identify the variables responsible for the nondifferential responding characteristic of generalized imitation. The evidence to date suggests that generalized imitation is a function of the particular discrimination procedures used in such research, the social context in which the imitative behavior is performed, and the nature of the explicit and implicit instructions under which the child is operating.

Within these studies, and others to be described later, there also is abundant evidence to support the conclusion that generalized imitation is not simply a learning deficit, as has been suggested repeatedly by Bandura and his colleagues. Research manipulating discrimination procedures, instructions, the social context, and recognition tasks have shown that the child may clearly recognize the contingencies associated with the various responses being modeled and yet, under the procedures which typify generalized imitation studies, the child will respond nondifferentially to all responses modeled. Thus, having learned the explicit contingencies associated with each response being modeled may be necessary for discriminative imitation, but it is not sufficient to produce it.

Instead of indicating that generalized imitation results from discrimination-learning failures, there is evidence from several sources to suggest that subtle, but remarkably powerful, social and instructional

influences are operating within the procedures to create and maintain the nondifferential behavior observed.

In most generalized imitation research, the experimenter models each response sequentially, with the modeling of each response constituting a trial. After a response is modeled, an interval is provided during which the child may or may not respond by imitating the modeled response. Imitating some responses consistently produces reinforcement of some kind, whereas imitating other responses consistently does not. Often, the modeling of each response is preceded by a verbal instruction such as, "Do this," or, "Say" -- though in some studies these instructions, or ones comparable to them, occur only at the beginning of the first session.

It could be argued that these procedures create social demands which are likely to produce imitative behavior, even if the child knows that the particular response being imitated will not result in reinforcement. The discrete-trial, sequential procedures typically used, require that the child withhold responding or respond incorrectly in order to demonstrate discriminative imitation. However, the explicit and implicit instructions embedded within the procedures also create potential social consequences for failing to respond. To not respond under these conditions, the child must disobey an instruction, and it simply may be potentially more aversive for him to disobey than to respond on otherwise "unreinforced" trials.

The research to be described today is relevant to this analysis of generalized imitation and to several parameters that it suggests: For one, it is relevant to the role of explicit and implicit instructions in generalized imitation; secondly, to the generality of the effect to

other nonimitative "go - no-go" behavioral situations and, third, to the effect of specific histories on such imitative and nonimitative behavior. In addition, the research provides further evidence concerning the relative merits of a social control analysis of generalized imitation in contrast with the discrimination-failure analysis suggested by Bandura.

The first study that I will describe was conducted in collaboration with Rodger Bufford, who is now at American University. The purpose of the study was to examine the role of verbal instructions in generalized imitation. As was pointed out earlier, most investigations of generalized imitation have either used a "Do this" instruction before each response is modeled or have used something comparable to the "Do this" instruction at least in the early stages of the experiment. One purpose of the present study was to compare these two instructional priming procedures.

Eight first-grade girls served as subjects and Rodger was the experimenter-model. Only two responses were modeled -- one response which was reinforced if imitated (which I'll call an S^D response), and one response which was not reinforced whether imitated or not (which I'll call an S-delta response). A token-reinforcement system was used, with a predetermined number of tokens necessary for the child to earn a preselected toy.

In each session, each of the two responses was modeled 15 times in random succession. A 10-second intertrial interval separated the modeling of each response. Thus, there were 30 successive-discrimination trials in each session and all the child had to learn were the contingencies associated with <u>two</u> responses.

At the beginning of the first session, and only in the first session, two different responses were modeled. For four of the eight children, a "Do this" instruction preceded the modeling of these two initial responses and the instruction never was repeated thereafter. Thus, for these four children, the "Do this" instruction never preceded the S^D or the S-delta response used in the remainder of the experiment and, indeed, never occurred following the first two trials of the first session. For the other four children, the "Do this" instruction continued to precede the modeling of every response throughout the study.

The results for the first 10 sessions of these manipulations can be seen in the left segment of each graph in Figure 1. The four children receiving the "Do this" instruction before each trial are on the left of the figure; the four children who received the "Do this" instruction only in the first session, are on the right. Unfortunately, Subject 8 no longer was available after Session 6.

As can be seen in the figure, none of the eight children developed discriminative imitation. Both the reinforced and the unreinforced responses were imitated almost every time they were modeled throughout the 10 sessions, regardless of whether the "Do this" instruction preceded each response or was eliminated.

In Sessions 11, 15, and 18, another instructional manipulation was attempted. The child was brought from her classroom by another experimenter to a room adjacent to the usual experimental room. The child was told that their regular experimenter was busy with another child right now but that she could watch the other child and the experimenter through a window until the experimenter was ready for her. The second experimenter stayed in the room with the child and watched along

with her. For four of the children the scene observed was a confederate child performing nondifferentially on the same two responses used for the observing child. For the other three subjects the scene observed was a confederate child performing differentially on the same two responses. Following the fourteenth observed trial the confederate child turned in her tokens, received her prize, and then the subject began her session.

The effect of these observational manipulations are shown in the second segment of each graph in Figure 1 (Sessions 11 to 20). The triangles at the bottom of each graph indicate sessions preceded by an observation period. The "DM" above three of the graphs indicates children who observed a differentially responding confederate; the "GM" indicates the observation of a "generalizing" confederate.

As the data indicate, all seven children, including the three who observed a differentially imitating confederate, failed to develop differential imitation themselves. Generalized imitation was maintained by all seven subjects.

In a third set of manipulations, each child again observed the confederate's performance before performing herself, but in addition the experimenter, who was sitting with the child during the observation period, added a commentary describing the confederate's behavior. For example, the experimenter would say, "She did that one, and she got a token," or, "She did that one, and she didn't get a token," or, "She didn't do that one." The subject then performed in her session as usual.

The results of these manipulations are shown in the third segment of Figure 1 (Sessions 21 to 24). As can be seen, the commentary, which was hoped to focus the attention of the subject on the confederate's

behavior and on the consequences of that behavior, had little or no effect.

A final set of manipulations also involved a commentary while the subject watched the confederate. The content of this commentary, however, was aimed at trying to suggest to the subject what she was supposed to do in the experiment. For example, the experimenter said, "Good, she did that one; she's supposed to," or, "Oh no, she did that one; she's not supposed to," or, "Good, she didn't do that one; she's not supposed to." The subject then performed in her session as usual.

The results of this last commentary and observational technique are summarized in the final sessions of Figure 1. Five of the subjects (S-3, S-4, S-5, S-6, and S-7) clearly continued to imitate both responses indiscriminatively even after this extreme instructional prime. Only Subject 2's behavior was markedly affected. By the end of the experiment, Subject 2 finally developed consistent differential imitation.

The remarkable tenacity of generalized imitation in the preceding experiment, despite the absence of verbal instructions to imitate following the first session for half the children and despite the several observational and verbal prompting procedures used in the latter stages of the study, led to another experiment which was designed to determine whether generalized imitation would occur in the total absence of verbal instructions.

In this study, which was conducted in collaboration with Ben Cooley, the same observational procedure as used by Bandura and Barab in 1971 was employed. That is, verbal instructions were eliminated entirely. Instead, four girls from a first-grade class were given the

opportunity to observe a child-confederate who was performing imitatively.

The experimenter first modeled one or two responses while facing the confederate, which she previously had been instructed to imitate. Then the experimenter faced the subject and modeled one or two responses. This procedure continued until each child had imitated 20 responses and then the session was ended. Every imitative response of both children in the first session was reinforced with a tradable token.

In all sessions following the first one, the subject performed without the confederate present and a new set of 10 S^D and 5 S-delta responses was used. In each session, each response was modeled three times, for a total of 45 responses per session.

The results of these procedures can be seen in Figure 2. As can be seen, although there were no verbal instructions in the experiment, generalized imitation still resulted and was maintained.

In the final session of the study, the four children were given a recognition test to determine whether they could identify the contingencies associated with the 15 responses being modeled. Each response was modeled once in a random order and the child was instructed to tell the experimenter whether the particular response modeled previously had been reinforced or not when imitated. Subjects 1 and 4 correctly identified the contingencies associated with all 15 responses. Subject 2 correctly identified 14 of the 15. And, Subject 3 correctly identified 12 of the 15.

Following the recognition-test procedures, the imitation procedures were resumed. When resumed, all four children continued to imitate every response modeled.

The data of the last two experiments demonstrate that verbal instructions are unnecessary to produce generalized imitation. The data also indicate that generalized imitation will occur even when the children clearly can identify the consequences associated with the various responses being modeled. One puzzling result, however, was the complete ineffectiveness of the observational procedures used when the observation was of a differentially performing model. If the observation of a differentially performing model could be considered to be a nonverbal, implicit instruction, one should expect the observation of a confederate performing discriminatively to have some effect on the children's behavior. However, it did not.

To examine this result, two related experiments were conducted. These studies were conducted in collaboration with Barbara Wilcox and Terry Meddock. One purpose of the first study was to replicate the finding that the observation of a differentially performing model may be insufficient to produce differential responding. Unlike the previous experiment conducted with Rodger Bufford, however, the present experiment included no verbal instructions -- not even in the first session. In addition, the situation was changed markedly in that a completely different task was used. Thus, the study was a systematic replication of the Bufford experiment, rather than a direct replication. The second purpose of the study was to examine the generality of the "generalized imitation" effect in a "go - no-go" situation, comparable procedurally to generalized imitation, but involving no imitative behavior.

In this experiment, a visual discrimination apparatus was used. A triangle or a circle was back-projected on a plastic response panel. Pressing the panel activated automated programming and recording

equipment and delivered reinforcement in the form of a light on a reinforcement box having 50 lights on its front side. Lights on the reinforcement box cumulated until enough lights had been obtained to earn a preselected toy.

Four 4½-year-old boys served as subjects. For two of the boys the triangle served as the S^D and the circle served as the S-delta. For the other two boys, the functions of the stimuli were reversed. The stimuli were presented singly, in a random order, for 50 trials in each session. Each stimulus was present for 5 seconds, followed by a 3-second interval before the next stimulus in the random series became available.

In the first phase of the study, the children performed for 9 or 11 sessions under this single-stimulus, "go - no-go" procedure. Other procedures also were used, but we will not go into them here. The results of these manipulations are shown in Figure 3. Essentially, the results show that the children responded to both stimuli indiscriminatively in a manner characteristic of generalized imitation, even though no imitative behavior was involved.

All four children then were given the opportunity to observe an adult model who responded only to the stimulus that was the S^D for the child and never to the child's S delta. The adult model performed in this differential manner for a total of 20 trials and then the child began his session as usual. For S-1 and S-2 the observation of the differentially performing adult preceded Sessions 10 and 12; for S-3, the observation preceded Sessions 12 and 13, and for S-4 the observation preceded only Session 12.

The results of presenting the differentially performing model are shown in Figure 3 under the condition labeled "DM." As the data

indicate, observing the adult model performing differentially had an effect on only one of the four children (S-4). The others continued to respond indiscriminatively even after the observational procedure was repeated.

In both of the preceding experiments, which attempted to produce differential behavior by having the child observe a differentially responding confederate, the observational procedure typically failed to be effective for more than an occasional subject. However, in both studies, the observational procedure was not used until the child had had a considerable history of responding nondifferentially in the experiment.

To determine whether this history of nondifferential responding might be responsible for the results obtained, another experiment was conducted.

Four more boys obtained from the same preschool class as in the last study served as subjects. The apparatus and procedures were identical to those used with the first four boys. However, the observation of the differentially performing adult was made available before the children began the first session of the experiment.

The results are shown in the first two sessions of Figure 4. All four boys responded differentially starting with the first session when the observational procedures were used initially. Reversing the response consequences, starting in Session 3, produced a corresponding reversal in behavior. That is, when the contingencies were reversed, the boys stopped responding to the previous S^D and began responding to the current S^D.

Before the final session of the study, the adult-confederate returned and again modeled responding for 20 trials. This time,

however, the confederate responded to both stimuli nondifferentially. For one boy (S-7), observing the nondifferential model had no effect. He continued to respond differentially. For two other subjects (S-5 and S-6), approximately half of the S-deltas now were responded to. For the last subject (S-8), observing the nondifferentiating adult model was effective. That is, Subject 8 stopped responding di t. lly and, like the model, began responding nondifferentially.

The preceding studies strongly suggest that the initial priming procedures used in generalized imitation studies are extremely important in determining the nature of the behavior obtained. Whether the procedures involve explicit verbal instructions or more implicit observational instructions, and whether the task is an imitative one or not, the effect of the initial priming procedures may create a durable pattern of responding that is very difficult to disrupt. The fact that the child is differentially reinforced for literally hundreds of trials following these initial primes, may have no effect on decreasing the frequency with which he performs the otherwise "unreinforced" responses.

The studies also suggest that the specific timing of these instructional procedures may be critical. That is, the same verbal or observational manipulation may have a dramatic effect or no effect, depending upon whether the manipulation occurs early or late in the experiment. (This might explain why various attempts to eliminate generalized imitation through the use of DRO procedures, extinction, or contingent time-out have not been uniformly successful. Perhaps, if such procedures were used from the beginning of the experiment, they would have a more profound and dependable effect.)

Although the preceding studies do demonstrate that the early observation of a differentially responding model may be sufficient to promote differential imitation by the observing child, they do not indicate the source of this effect. The confederates observed by the children not only were imitating differentially, they also were being differentially reinforced and were engaged in the same behavior that the observing child subsequently was to have modeled for him. Which of these variables may be critical to the results obtained, remains unanalyzed. Therefore, to determine whether the observation of a differentially performing model, per se, would be sufficient to produce differential imitation by the child, another experiment was conducted.

In this experiment, 56 first-grade children performed in a 2x2x2 group-factorial design. The design and the conditions operative in the eight groups are summarized in Figure 5.

Four female graduate students served as experimenters and confederates in the study. As the first factor in the study, the confederates responded to the experimenter's behavior either by imitating one or both of the two responses modeled by the experimenter. That is, the confederates performed either differentially or in a generalizing manner. Secondly, the experimenter either modeled the same two responses to the confederate that she modeled for the child, or the experimenter modeled two different responses to the confederate than the two responses modeled for the child. Finally, as a third factor, the confederates either were differentially reinforced for their imitative behavior or were not reinforced at all.

It should be noted that all manipulations involved the activities and contingencies of the confederate. All children in the eight groups

received the same contingencies. That is, they all were differentially reinforced for imitating one of the two responses modeled by the experimenter even though their observations of the confederate differed.

Each child performed for two sessions. Each session was composed of 30 trials for the confederate and 30 trials for the child. Thus, in each session each child had 15 opportunities to respond to the one S^D response and 15 opportunities to respond to the one S-delta.

In each session, the experimenter first turned toward the confederate and modeled for two trials. A 10-second intertrial interval followed the modeling of each response.

After the experimenter presented two trials to the confederate, the experimenter then turned toward the child and proceeded for two trials without comment. Pairs of trials alternated in this manner until both the confederate and the child had received 30 trials each in each of the two sessions.

The results of this experiment are summarized in Figure 6. The data for the first four groups, who observed the differentiating confederate, are presented in the left figure; the data for the last four groups, who observed the generalizing confederate, are presented in the right figure.

Not a single one of the 28 children performing with the generalizing confederate in any of the four groups developed differential imitation. Indeed, there was no trend toward differential behavior for any of these 28 children either within or between sessions.

In the four groups performing with the differentiating confederate, the extent to which differential imitation developed closely paralleled the extent to which the conditions operative for the

confederate were like the conditions operative for the child. For example, six of the seven children performing in Group 1 developed perfect or near perfect differential imitation, while none of the children in Group 4 developed differential imitation. Two children developed differential imitation in Group 2, and two trended in that direction in Group 3.

An analysis of variance indicated that the imitation of S^D and S-delta responses differed significantly as a function of the differentiating or generalizing confederate ($F=13.30$, 1/48, $p<.001$) and as a function of whether the confederate's responses were the same or different than those modeled for the child ($F=12.89$, 1/48, $p<.001$). Thus, simply observing differential imitation, per se, in the situation was not sufficient by itself to produce differential imitation by the observing child.

The effect of the presence or absence of reinforcement to the confederate was not significant statistically ($F=3.07$, 1/48, $p<.09$), but it did interact significantly with the effect of the confederate's differentiating or generalizing behavior ($F=4.64$, 1/48, $p<.04$). In other words, there was no vicarious reinforcement effect unless the confederate also was performing differentially.

At the end of the second session, the 56 children were given a recognition test. The experimenter modeled the S^D and S-delta response five times each in a random order, and asked the child to tell her whether the response just modeled had produced reinforcement in the past. Eight of the children seemingly did not understand the instruction or at least refused to answer on any of the 10 trials. Of the remaining 48 children, 23 correctly identified the contingencies on all 10 trials.

Of those 23, 13 had been imitating nondifferentially throughout the two sessions, again demonstrating that being able to discriminate contingencies may be necessary for differential imitation, but not sufficient.

Taken together, the data of the several experiments described strongly suggest that generalized imitation, as studied under the "go - no-go," successive-discrimination procedures common to this area, is largely a function of the particular priming procedures used to generate the imitative behavior. Whether the child is explicitly instructed verbally to, "Do this," may not be necessary to produce generalized imitation. Indeed, much more subtle instructions can have the same effect. It seems clear, however, that without early unambiguous verbal, observational, or procedural instructions to do otherwise, generalized responding appears to be the vastly more dominant mode of action of these children than is differential responding, regardless of how frequently and judiciously the children are differentially reinforced.

It also seems reasonable to suggest from the data that generalized imitation is only one subset of a much larger class of behaviors. The nondifferential behavior generated is not limited specifically to imitative behavior. Only one study was presented here to demonstrate this, but we have several others, and Jerry Martin's research clearly supports this notion.

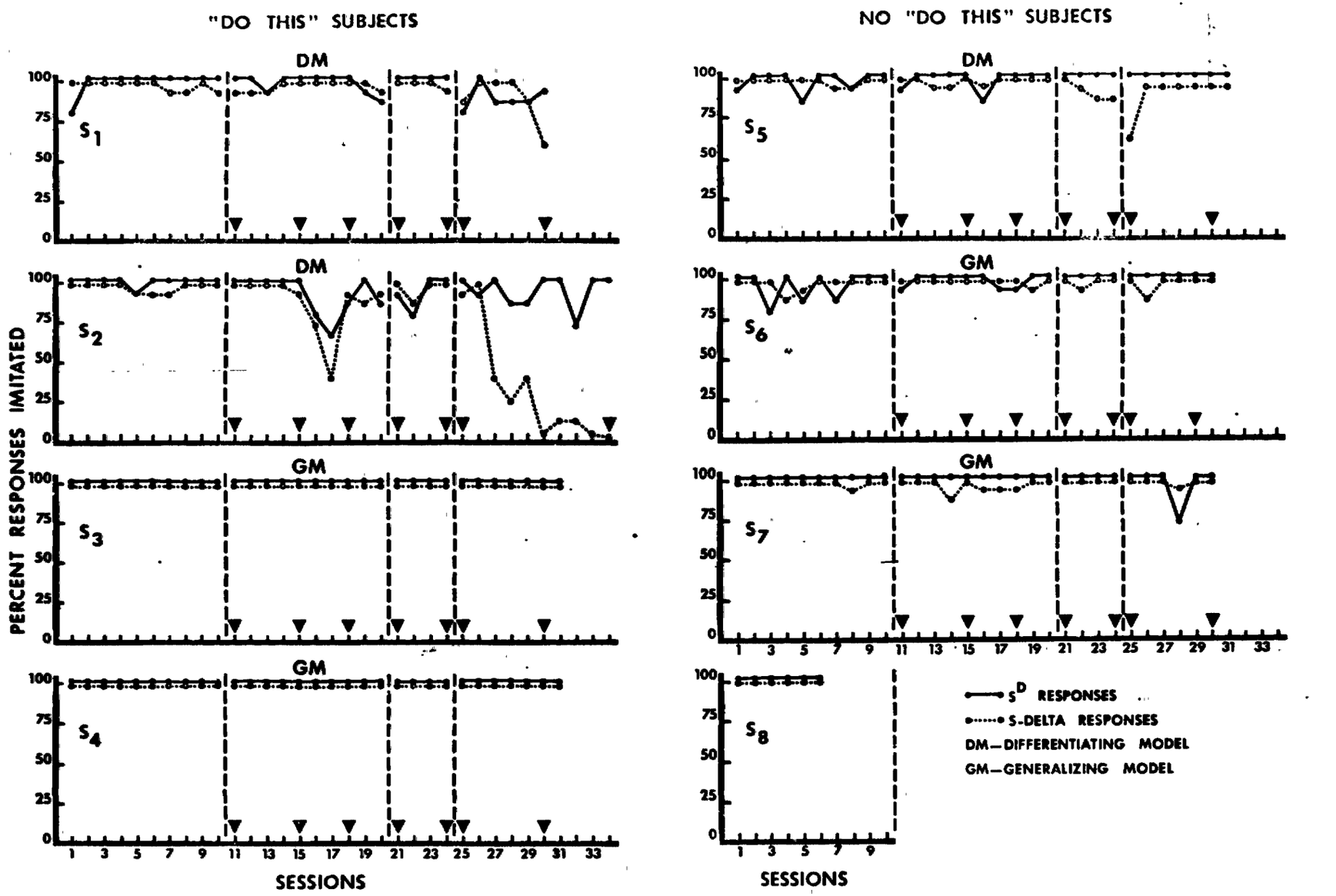
In conclusion, as I have proposed elsewhere, I think it might be beneficial to view the generalized imitation situation as one in which two contingency systems are operating simultaneously. One system involves the explicit contingencies being manipulated by the experimenter, contingent upon S^D and S-delta responding. The second, less explicit contingency system derives from the child's history of

reinforcement and punishment regarding compliance with social demands. If, in the absence of a sufficiently reinforcing alternative response, and in the presence of a sufficiently powerful observer, the child assumes that he is supposed to respond, he is likely to do so since, by doing so, he may avoid potential disapproval for not responding or maintain potential approval for responding.

If this analysis is correct, then the manipulation of at least four parameters should affect the probability of obtaining generalized responding under these conditions: First, generalized responding should be affected by the manipulation of the child's assessment of the situational demands. This can be accomplished through the use of direct verbal instructions; or by having the child observe others early in the experiment performing on the task differentially, or, perhaps, by giving the child a preceding experimental history in which differential responding in situations progressively like the generalized imitation situation is developed. Second, generalized responding should be affected by the specific social characteristics of the individual giving the instructions and of those present when the child performs. In short, the stronger the potential approval or disapproval, the greater the likelihood of generalized responding, given that the child believes that that is what is expected of him and given that social consequences are important to him. Third, as an extension of the last point, generalized responding should be reduced to the extent that the social control existing in the situation is reduced. Thus, by having the child perform alone, the social setting conditions are modified in such a way as to reduce the threat of disapproval for noncompliance and the potential approval for compliance. Therefore, the manipulated differential

reinforcement is more likely to become the dominant controlling system. Finally, generalized responding should be reduced to the extent that the differential reinforcement system is modified to include forms of punishment for performing S-delta responses. To the extent that the strength of the punishment added exceeds the social demands to respond created by the instructions and the continued surveillance, discriminative responding should result.

We have data on each of these points, but their presentation best await another social setting.


"DO THIS" SUBJECTS
NO "DO THIS" SUBJECTS
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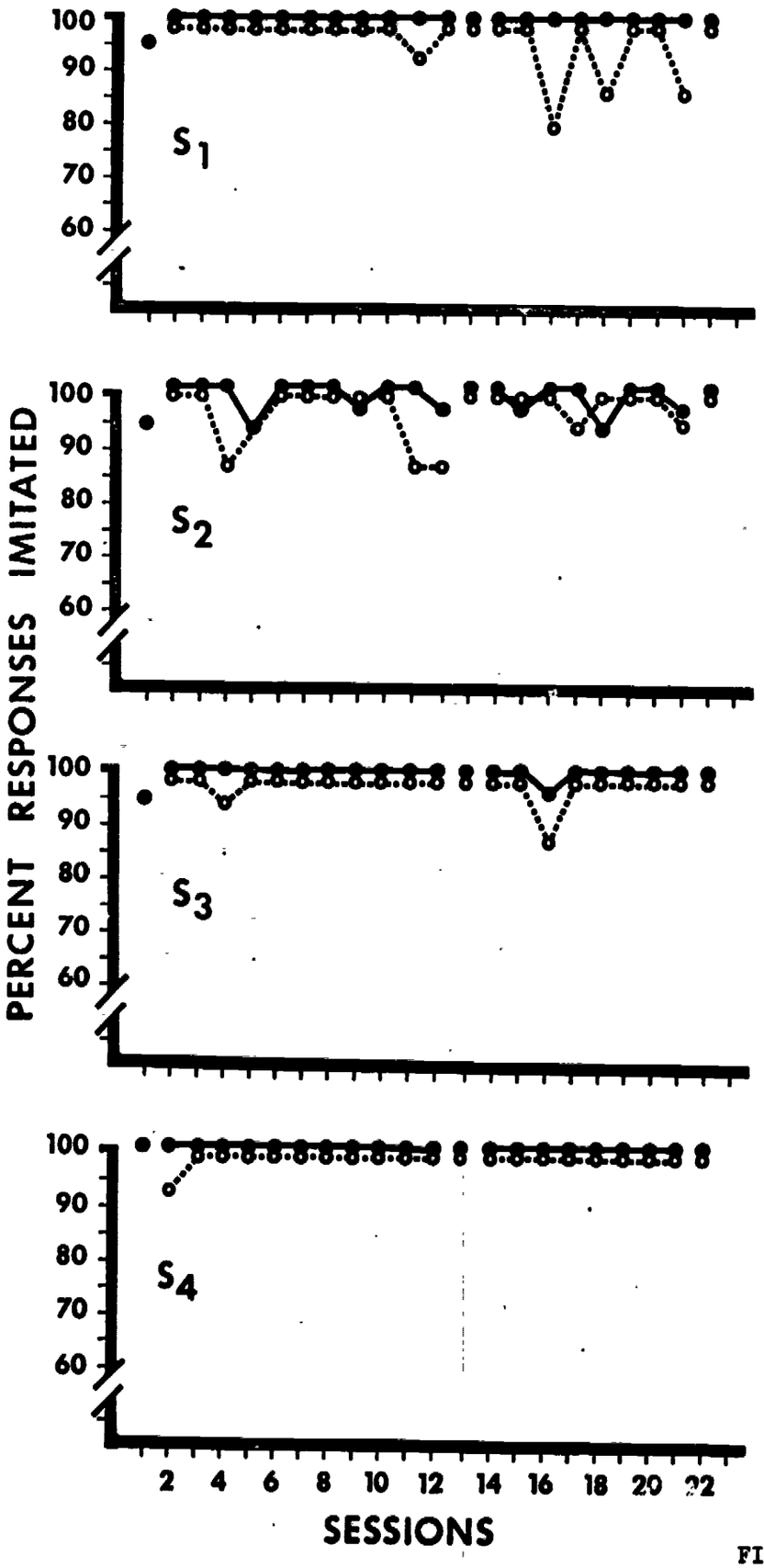
S-DELTA RESPONSES
DM—DIFFERENTIATING MODEL
GM—GENERALIZING MODEL

FIGURE 1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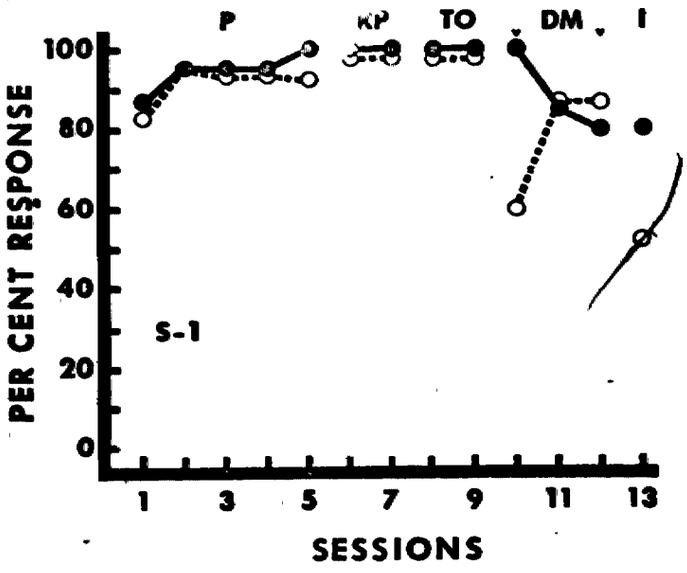
SESSIONS

FIGURE 2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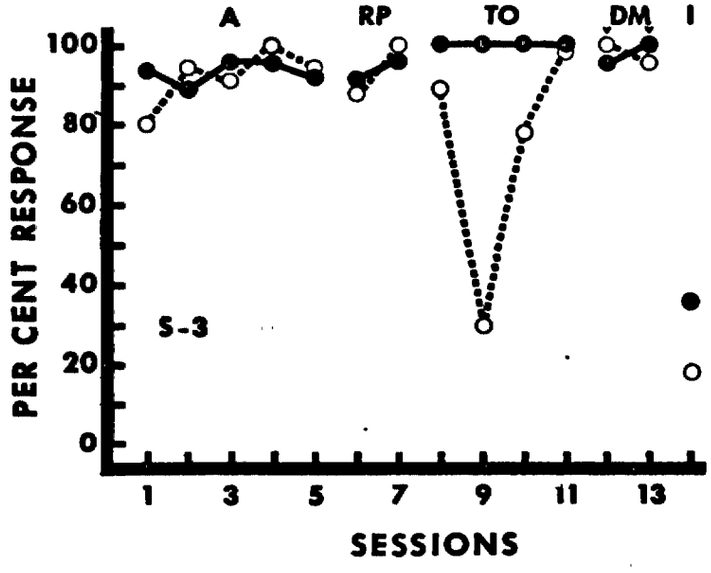
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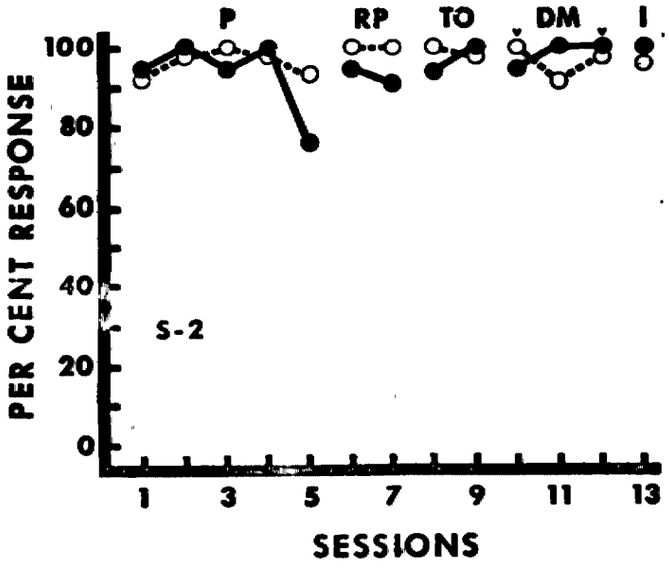
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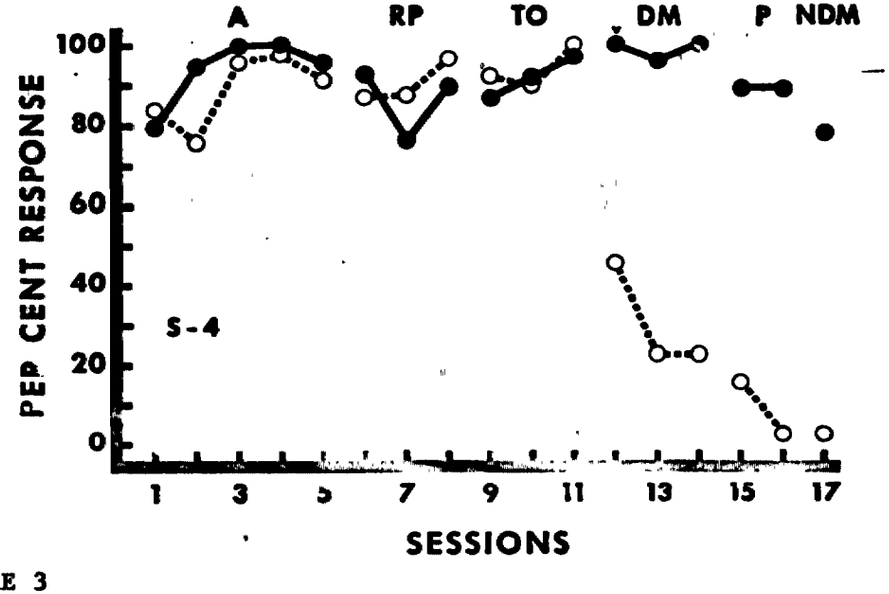
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FIGURE 3

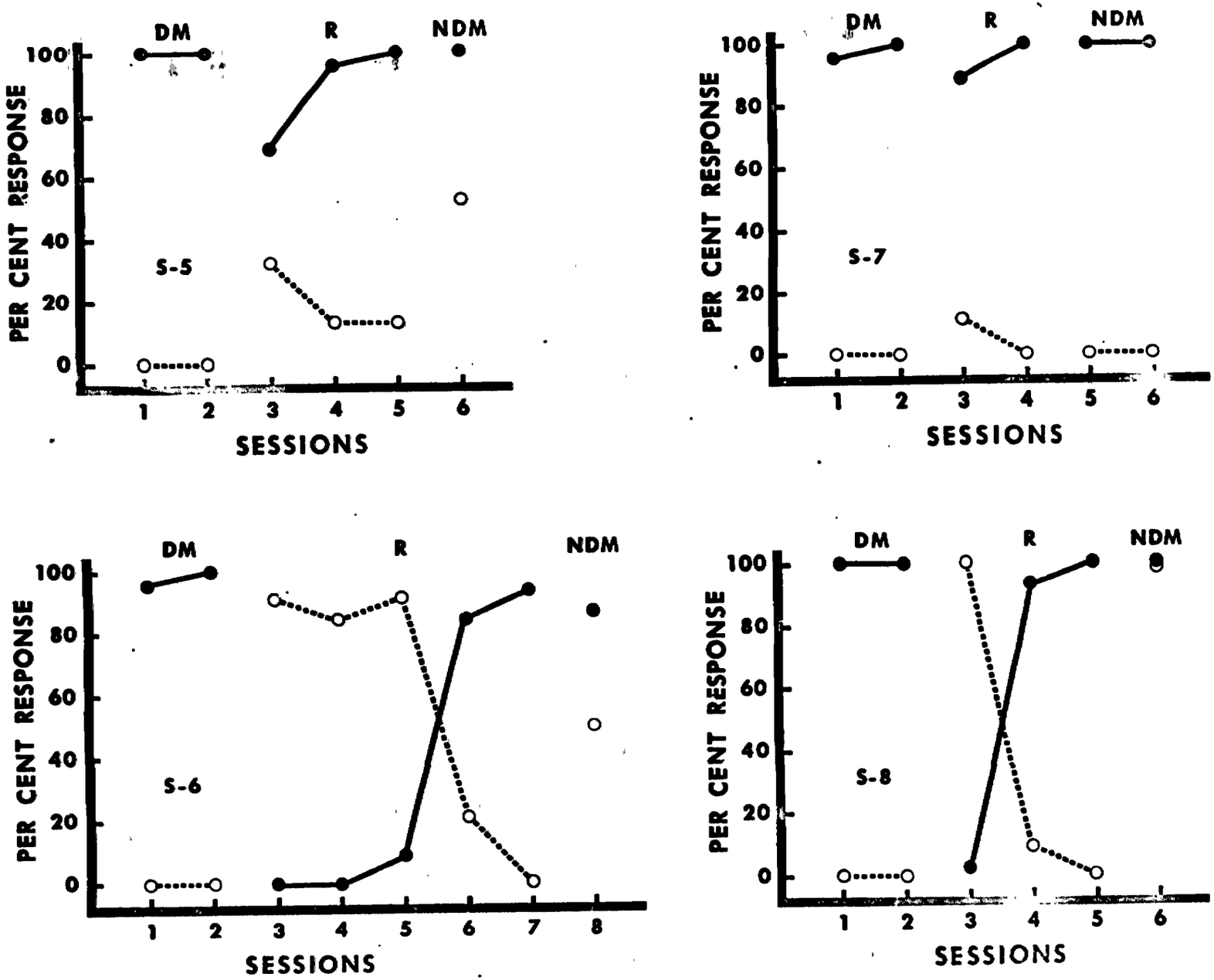
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FIGURE 4

FIGURE 4

Differentiating Confederate				Generalizing Confederate			
Same		Confederate's Responses Different		Same		Different	
Yes	No	Yes	No	Yes	No	Yes	No
Groups							
1	2	3	4	5	6	7	8

FIGURE 5

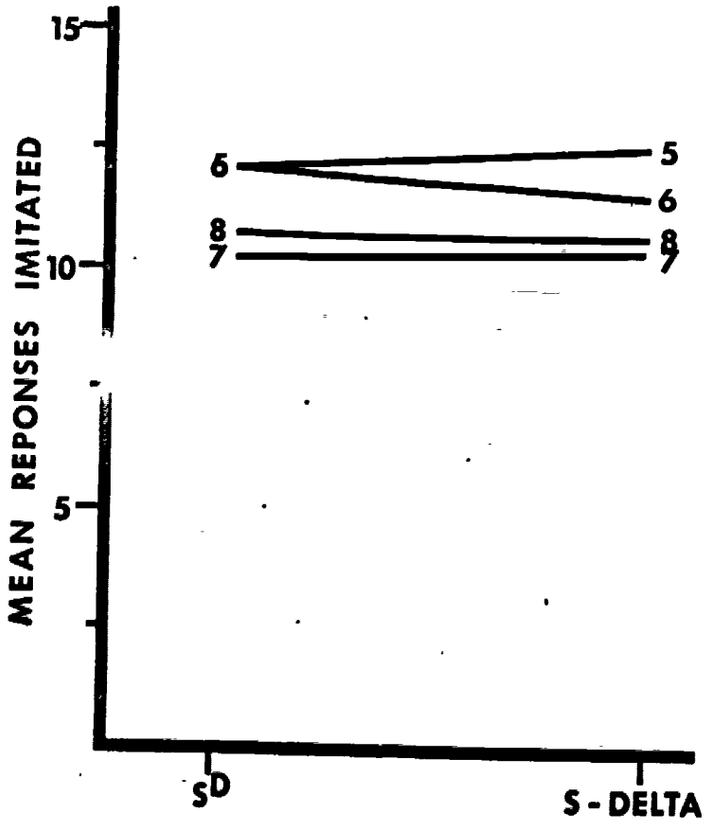

FIGURE 6a

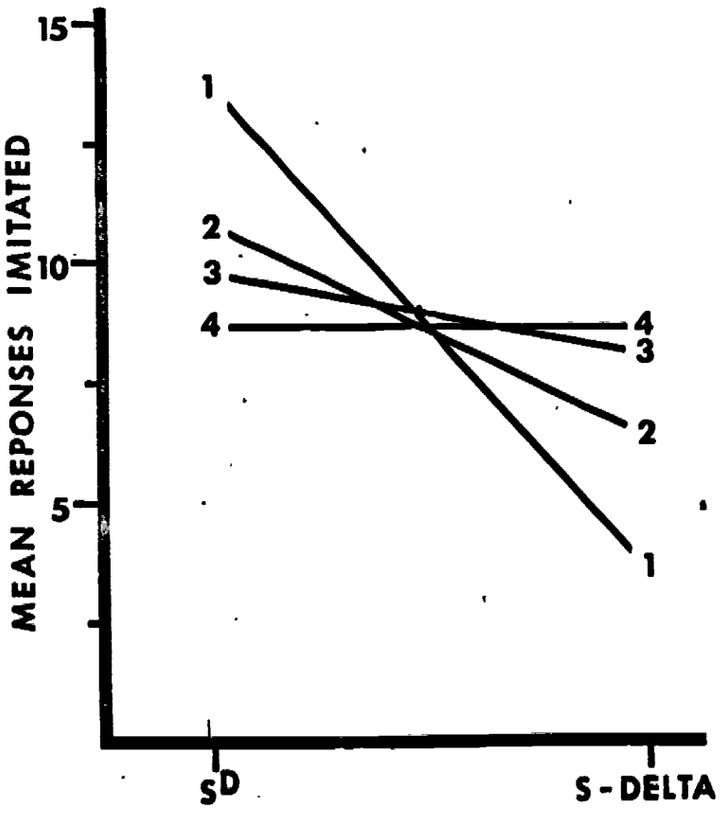

FIGURE 6b